CLAIMS

What is claimed is:

1. An isolated nucleic acid encoding a mammalian REMODELIN, or a fragment thereof.

2. The isolated nucleic acid of claim 1, wherein said nucleic acid shares at least about 33% sequence identity with a nucleic acid encoding at least one of rat REMODELIN (SEQ ID NO:1), and a human REMODELIN (SEQ ID NO:3).

3. An isolated nucleic acid encoding a mammalian REMODELIN, wherein the amino acid sequence of said REMODELIN shares at least about 6% sequence identity with an amino acid sequence of at least one of SEQ ID NO:2, SEQ ID NO:4, and SEQ ID NO:5.

4. An isolated polypeptide comprising a mammalian REMODELIN.

5. The isolated polypeptide of claim 4, wherein said mammalian REMODELIN molecule shares at least about 6% sequence identity with an amino acid sequence of at least one of SEQ ID NO:2, SEQ ID NO:4, and SEQ ID NO:5.

6. The nucleic acid of claim 1, said nucleic acid further comprising a nucleic acid encoding a tag polypeptide covalently linked thereto.

7. The nucleic acid of claim 6, wherein said tag polypeptide is selected from the group consisting of a green fluorescent protein tag polypeptide, an influenza virus hemagglutinin tag polypeptide, a myc tag polypeptide, a glutathione-S-transferase tag polypeptide, a myc-pyruvate kinase tag polypeptide, a His6 tag polypeptide, a FLAG tag polypeptide, and a maltose binding protein tag polypeptide.

8. The nucleic acid of claim 1, said nucleic acid further comprising a nucleic acid specifying a promoter/regulatory sequence operably linked thereto.

9. A vector comprising the nucleic acid of claim 1.

10. The vector of claim 9, said vector further comprising a nucleic acid specifying a promoter/regulatory sequence operably linked thereto.

11. A recombinant cell comprising the isolated nucleic acid of claim 1.

12. A recombinant cell comprising the vector of claim 9.

13. An isolated nucleic acid complementary to the nucleic acid of claim 1, said complementary nucleic acid being in an antisense orientation.

14. The isolated nucleic acid of claim 13, wherein said nucleic acid shares at least about 33% identity with a nucleic acid complementary with a nucleic acid having the sequence of at least one of a rat REMODELIN molecule (SEQ ID NO:1), and a human REMODELIN molecule (SEQ ID NO:3).

15. A recombinant cell comprising the isolated nucleic acid of claim 13.

16. An antibody that specifically binds with a mammalian REMODELIN molecule polypeptide, or a fragment thereof.

17. The antibody of claim 16, wherein said antibody is selected from the group consisting of a polyclonal antibody, a monoclonal antibody, a humanized antibody, a chimeric antibody, and a synthetic antibody.

18. A composition comprising the antibody of claim 16 and a pharmaceutically-acceptable carrier.

19. A composition comprising the isolated nucleic acid of claim 13 and a pharmaceutically-acceptable carrier.

20. A composition comprising the isolated nucleic acid of claim 1 and a pharmaceutically-acceptable carrier.

21. A composition comprising the isolated polypeptide of claim 4 and a pharmaceutically-acceptable carrier.

22. A transgenic non-human mammal comprising the isolated nucleic acid of claim 1.

23. A method of treating a disease mediated by abnormal expression of a REMODELIN molecule in a human, said method comprising administering to a human patient afflicted with a disease mediated by abnormal expression of a REMODELIN molecule a REMODELIN molecule expression-inhibiting amount of the composition of claim 19.

24. The method of claim 23, wherein said disease is selected from the group consisting of impaired wound healing, fibrosis of an organ, ectopic ossification, and hypertrophic scar formation.

25. A method of diagnosing arterial restenosis in a mammal, said method comprising obtaining a biological sample from said mammal, assessing the level of REMODELIN in said biological sample, and comparing the level of REMODELIN in said biological sample with the level of REMODELIN in a biological sample obtained from a like mammal not afflicted with arterial restenosis, wherein a higher level of REMODELIN in said biological sample from said mammal compared with the level of REMODELIN in said biological sample from said like mammal is an

indication that said mammal is afflicted with arterial restenosis, thereby diagnosing arterial restenosis in said mammal.

26. The method of claim 25, wherein said biological sample is selected from the group consisting of a blood vessel sample, and a damaged tissue sample.

27. A method of diagnosing negative remodeling in a mammal, said method comprising obtaining a biological sample from said mammal, assessing the level of REMODELIN in said biological sample, and comparing the level of REMODELIN in said biological sample with the level of REMODELIN in a biological sample obtained from a like mammal not afflicted with negative remodeling, wherein a higher level of REMODELIN in said biological sample from said mammal compared with the level of REMODELIN in said biological sample from said like mammal is an indication that said mammal is afflicted with negative remodeling, thereby diagnosing negative remodeling in said mammal.

28. A method of diagnosing fibrosis in a mammal, said method comprising obtaining a biological sample from said mammal, assessing the level of REMODELIN in said biological sample, and comparing the level of REMODELIN in said biological sample with the level of REMODELIN in a biological sample obtained from a like mammal not afflicted with fibrosis, wherein a higher level of REMODELIN in said biological sample from said mammal compared with the level of REMODELIN in said biological sample from said like mammal is an indication that said mammal is afflicted with fibrosis, thereby diagnosing fibrosis in said mammal.

29. A method of identifying a compound that affects expression of REMODELIN in a cell, said method comprising contacting a cell with a test compound and comparing the level of REMODELIN expression in said cell with the level of REMODELIN expression in an otherwise identical cell not contacted with said test compound, wherein a higher or lower level of REMODELIN expression in said cell contacted with said test compound compared with the level of REMODELIN

expression in said otherwise identical cell not contacted with said test compound is an indication that said test compound affects expression of REMODELIN in a cell.

30. A compound identified by the method of claim 29.

31. A method of identifying a compound that reduces expression of REMODELIN in a cell, said method comprising contacting a cell with a test compound and comparing the level of REMODELIN expression in said cell with the level of REMODELIN expression in an otherwise identical cell not contacted with said test compound, wherein a lower level of REMODELIN expression in said cell contacted with said test compound compared with the level of REMODELIN expression in said otherwise identical cell not contacted with said test compound is an indication that said test compound reduces expression of REMODELIN in a cell.

32. A compound identified by the method of claim 31.

33. A method of identifying a compound that affects TGF-β signaling, said method comprising contacting a cell with a test compound and comparing the level of REMODELIN expression in said cell with the level of REMODELIN expression in an otherwise identical cell not contacted with said test compound, wherein a higher or lower level of REMODELIN expression in said cell contacted with said test compound compared with the level of REMODELIN expression in said otherwise identical cell not contacted with said test compound is an indication that said test compound affects TGF-β signaling in a cell.

34. A kit for alleviating a disease mediated by abnormal expression of a REMODELIN in a human, said kit comprising a REMODELIN expression-inhibiting amount of the composition of claim 19, said kit further comprising an applicator, and an instructional material for the use thereof.

35. The kit of claim 34, wherein said disease is selected from the group consisting of negative remodeling, arterial restenosis, vessel injury, fibrosis.

36. A kit for alleviating a disease mediated by abnormal expression of a REMODELIN in a human, said kit comprising a REMODELIN expression-inhibiting amount of the composition of claim 20, said kit further comprising an applicator, and an instructional material for the use thereof.

37. A kit for treating a bone disease in a mammal, said kit comprising a REMODELIN expression-inhibiting amount of an inhibitor of REMODELIN expression, said kit further comprising an applicator, and an instructional material for the use thereof.

38. A kit for treating a cartilage disease in a mammal, said kit comprising a REMODELIN expression-inhibiting amount of an inhibitor of REMODELIN expression, said kit further comprising an applicator, and an instructional material for the use thereof.

39. A kit for inhibiting tissue calcification, said kit comprising a REMODELIN expression-inhibiting amount of an inhibitor of REMODELIN expression, said kit further comprising an applicator, and an instructional material for the use thereof.

40. The kit of claim 39, wherein said tissue calcification is calcification of a transplant.

41. The kit of claim 40, wherein said transplant is a heart valve transplant.

42. A method of increasing REMODELIN expression in a mammal, said method comprising administering a REMODELIN expression increasing amount

of TGF-β to said mammal, thereby increasing REMODELIN expression in said mammal.

43. A method of reducing REMODELIN expression in a mammal, said method comprising administering a REMODELIN expression reducing amount of TGF-β receptor type II to said mammal, thereby inhibiting signaling via TGF-β receptor type II and reducing expression of REMODELIN in said mammal.

44. A method of affecting cellular gene expression in a mammal, said method comprising administering a nucleic acid encoding REMODELIN to said mammal, thereby affecting cellular gene expression in said mammal.

45. The method of claim 44, wherein said cellular gene is selected from the group consisting of TGF-β1, collagen IIIα1, osteopontin, biglycan, alkaline phosphatase, and bone morphogenic protein 4.

46. The method of claim 45, wherein said expression of osteopontin is dependent on Cbfa1.

47. A method of affecting cellular gene expression in a mammal, said method comprising administering a nucleic acid antisense to a nucleic acid encoding REMODELIN to said mammal, thereby affecting cellular gene expression in said mammal.

48. A method of treating bone disease in a mammal in need of such treatment, said method comprising administering to a mammal afflicted with said bone disease a REMODELIN expression-inhibiting amount of an inhibitor of REMODELIN expression, thereby inhibiting REMODELIN expression and treating said bone disease in said mammal.

49. The method of claim 48, wherein said bone disease is osteogenesis imperfecta.

50. A method of treating cartilage disease in a mammal in need of such treatment, said method comprising administering to a mammal afflicted with said cartilage disease a REMODELIN expression-inhibiting amount of an inhibitor of REMODELIN expression, thereby inhibiting REMODELIN expression and treating said cartilage disease in said mammal.

51. The method of claim 50, wherein said collagen disease is selected from the group consisting of osteogenesis imperfecta (OI), dystrophic epidermolysis bullosea (DEB), and Bethlem myopathy.

52. A method of diagnosing a bone disease in a mammal, said method comprising obtaining a biological sample from said mammal, assessing the level of REMODELIN in said biological sample, and comparing the level of REMODELIN in said biological sample with the level of REMODELIN in a biological sample obtained from an otherwise identical mammal not afflicted with bone disease, wherein a higher level of REMODELIN in said biological sample from said mammal compared with said level of REMODELIN in said biological sample from said like mammal is an indication that said mammal is afflicted with bone disease, thereby diagnosing said bone disease in said mammal.

53. The method of claim 52, wherein said bone disease is osteogenesis imperfecta.

54. A method of diagnosing a collagen disease in a mammal, said method comprising obtaining a biological sample from said mammal, assessing the level of REMODELIN in said biological sample, and comparing the level of REMODELIN in said biological sample with the level of REMODELIN in a biological sample obtained from an otherwise identical mammal not afflicted with a collagen

disease, wherein a higher level of REMODELIN in said biological sample from said mammal compared with said level of REMODELIN in said biological sample from said like mammal is an indication that said mammal is afflicted with a collagen disease, thereby diagnosing said collagen disease in said mammal.

55. The method of claim 54, wherein said collagen disease is selected from the group consisting of osteogenesis imperfecta (OI), dystrophic epidermolysis bullosea (DEB), and Bethlem myopathy.